



NOTE: A thin, discontinuous layer of windblown sand and silt, generally mixed with underlying glacial deposits by frost action and bioturbation, is present near the ground surface over much of

- the map area but is not shown. Artificial fill - Man-made. Material may vary from natural sand and gravel to quarry waste to sanitary landfill, includes highway and railroad embankments. This material is mapped only where it can be identified using the topographic contour lines or where actually observed. Minor artificial fill is present in virtually all developed areas of the quadrangle. Thickness of fill varies.
- Stream alluvium (Holocene) Sand, silt, gravel, and muck in flood plains along present rivers and streams. As much as 3 m (10 ft) thick. Extent of alluvium indicates most areas flooded in the past that may be subject to future flooding. In places the unit is indistinguishable from, grades into, or is interbedded with
- wetlands deposits (Hw). Freshwater wetland deposit (Holocene) - Muck, peat, silt, and sand deposited in poorly drained areas. Generally 0.5 to 3 m (1 to 10 feet) thick, but may be thicker in bogs. In places, this unit is indistinguishable from, grades into, or is interbedded with stream alluvium (Ha).
- Marine nearshore deposits (Pleistocene) Sand, silt, mud, and minor gravel. Consists of reworked till and glaciomarine sediments redistributed by marine currents and wave action as sea level fell during late-glacial time. May include shoreline, beach, and dune deposits in places. As much as 3 meters (10 ft) thick.
- Esker and/or ice-channel filling deposits (Pleistocene) Mostly gravel and sand, deposited by meltwater streams in tunnels within or beneath the ice (eskers) or in narrow fissures in the ice that were open to sky at the time of deposition (ice-channel fillings).
- Thickness varies from 0 to over 30 m (0-100 ft). Marine delta deposits (Pleistocene) - Mostly sorted and stratified sand and gravel. Consists of glaciomarine delta deposits, parts of which are ice-contact deposits. Contains kettle holes and may include esker or glaciomarine fan deposits. Deposits are graded to surface of late-glacial sea and are distinguished by flat top and foreset and topset beds. Deltas have been assigned unique geographic names listed below. Thickness varies from 0 to over 60 m (0-200 ft).
 - Pmdb Belgrade delta: topset-foreset contact at elevation 359 feet (Thompson and others, 1989). - Summerhaven delta: topset-foreset contact at

elevation 348 feet (Thompson and others, 1989).

- Marine fan deposits (Pleistocene) Mostly sorted and stratified sand, gravel, and silt. Consists of glaciomarine fan deposits, parts of which are ice-contact deposits. Contains abundant kettle holes and may include esker or bottom deposits. Most of these deposits were laid down in the late-glacial sea directly in contact with or just beyond the ice front by streams that deposited the associated adjacent eskers in tunnels in the ice 'upstream' of the fan deposits, which consist mainly of the tilted foreset beds of an incomplete delta (one which has not aggraded to sea level). Some fan deposits may be distinguished as individual units; only one, however, was given a unique geographic name below. Thickness varies from 0 to
 - Pmfs Summerhaven fan deposit: graded to southflowing channels through the top of the Summerhaven delta.

Presumpscot Formation: Glaciomarine bottom deposits (Pleistocene) - Silt and clay with local sandy beds and intercalations. Consists of late-glacial submarine fine-grained seafloor deposits. Commonly lies beneath surface deposits of units Pmn, Pmf, and Pmd; in places may be overlain by unmapped thin

Till (Pleistocene) - Light- to dark-gray, nonsorted to poorly sorted mixture of clay, silt, sand, pebbles, cobbles, and boulders; a predominantly sandy diamicton containing some gravel. Generally older than other glacial deposits and may underlie them. Thickness varies and generally is less than 6 m (20 ft), but may be more than 30 m (100 ft) in areas of streamlined topography. Many streamlined hills in this area are bedrock-cored.

dune deposits. As much as 21 meters (70 feet) thick.

Bedrock exposures - Not all individual outcrops are shown on the map. Gray dots indicate observed outcrops; ruled pattern indicates areas of abundant exposures and areas where surficial deposits are generally less than 3 m (10 ft) thick. Mapped in part from aerial photography; soil surveys (Faust and LaFlamme, 1978); previous geologic maps (Thompson, 1977; Thompson and Borns, 1985; Cameron and others, 1984); significant sand and gravel aquifer maps (Neil and Locke, 1999) and materials maps (Locke,

---- Contact - Boundary between units, approximately located.

Channel - Eroded by glacial meltwater or later meteoric runoff. Glacial striation - Point of observation is at dot. Arrow shows ice-flow direction inferred from striations on bedrock. Number is azimuth (in degrees) of flow direction.

Drumlin or other glacially streamlined hill - Symbol is parallel to glacial ice **Ice-margin position -** Line shows inferred approximate position of ice margin during

glacial retreat, based on topographic highs and a variety of other factors from place to place -- including accumulations of surface boulders, associated coarse-grained stratified deposits, associated roughly parallel meltwater channels, etc. Esker segment - A ridge of sand and gravel deposited by glacial meltwater flowing in a

tunnel within or beneath the ice. Chevrons aligned along crest of esker and point in direction of inferred meltwater flow. Large gravel pit margins, approximately located.

Abundant large boulders.

Current direction within stratified deposits. Measurement taken at tip of arrow

Glaciomarine delta topset-foreset contact elevation (in feet above modern-day sea level; from Thompson and others, 1989).

шшшш Frontal slope of delta, approximately located.

Kettle hole.

REFERENCES

Cameron, C. C., Mullen, M. K., Lepage, C. A., and Anderson, W. A., 1984, Peat resources of Maine - v. 4: southern and western Maine: Maine Geological Survey, Bull. 31, 123 p. Faust, A. P., and LaFlamme, K. J., 1978, Soil survey of Kennebec County, Maine: U.S. Dept. Agriculture, Soil Conservation Service Pub., 87 p., scale 1:20,000.

Locke, D. B., 1999, Surficial materials of the Belgrade quadrangle, Maine: Maine Geological Survey Open-File Map 99-68, scale 1:24,000. Neil, C. D., and Locke, D. B., 1999, Significant sand and gravel aquifers of the Belgrade

quadrangle, Maine: Maine Geological Survey Open-File Map 99-30, scale 1:24,000.

Geological Survey, scale 1:500,000. Thompson, W. B., 1977, Reconnaissance surficial geology of the Augusta quadrangle, Maine:

Thompson, W. B., and Borns, H. W., Jr. (editors), 1985, Surficial geologic map of Maine: Maine

Maine Geological Survey, Open-File Map 77-23, scale 1:62,500. Thompson, W. B., Crossen, K. J., Borns, H. W., Jr., and Anderson, B.G., 1989, Glaciomarine deltas of Maine and their relation to late Pleistocene-Holocene crustal movements, in Anderson, W. A., and Borns, H. W., Jr., (eds.), Neotectonics of Maine: Maine Geological Survey, Bulletin 40, p. 43-67.

USES OF SURFICIAL GEOLOGY MAPS

A surficial geology map shows all the loose materials such as till (commonly called hardpan), sand and gravel, or clay, which overlie solid ledge (bedrock). Bedrock outcrops and areas of abundant bedrock outcrops are shown on the map, but varieties of the bedrock are not distinguished (refer to bedrock geology map). Most of the surficial materials are deposits formed by glacial and deglacial processes during the last stage of continental glaciation, which began about 25,000 years ago. The remainder of the surficial deposits are the products of postglacial geologic processes, such as river floodplains, or are attributed to human activity, such as fill or other land-modifying features.

The map shows the areal distribution of the different types of glacial features, deposits, and landforms as described in the map explanation. Features such as striations and moraines can be used to reconstruct the movement and position of the glacier and its margin, especially as the ice sheet melted. Other ancient features include shorelines and deposits of glacial lakes or the glacial sea, now long gone from the state. This glacial geologic history of the quadrangle is useful to the larger understanding of past earth climate, and how our region of the world underwent recent geologically significant climatic and environmental changes. We may then be able to use this knowledge in anticipation of future similar changes for long-term planning efforts, such as coastal development or waste disposal.

Surficial geology maps are often best used in conjunction with related maps such as surficial materials maps or significant sand and gravel aquifer maps for anyone wanting to know what lies beneath the land surface. For example, these maps may aid in the search for water supplies, or economically important deposits such as sand and gravel for aggregate or clay for bricks or pottery. Environmental issues such as the location of a suitable landfill site or the possible spread of contaminants are directly related to surficial geology. Construction projects such as locating new roads, excavating foundations, or siting new homes may be better planned with a good knowledge of the surficial geology of the site. Refer to the list of related publications below.

OTHER SOURCES OF INFORMATION

1. Hildreth, C. T., 2004, Surficial geology of the Belgrade 7.5minute quadrangle, Kennebec County, Maine: Maine

Geological Survey, Open-File Report 04-38.

File Map 04-36.

- 2. Hildreth, C. T., and Locke, D. B., 2004, Surficial materials of the Belgrade quadrangle, Maine: Maine Geological Survey, Open-
- 3. Neil, C. D., 1999, Significant sand and gravel aquifers of the Belgrade quadrangle, Maine: Maine Geological Survey, Open-